Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of Parts 1, 2, 22, 24, 27, 90 and 95 of	)	WT Docket No. 10-4
the Commission's Rules to Improve Wireless	)	
Coverage Through the Use of Signal Boosters	)	

VERIZON WIRELESS REPLY TO OPPOSITION

Verizon Wireless, along with V-COMM, L.L.C., Verizon Wireless and Wilson Electronics ("Petitioners") jointly filed a Petition for Reconsideration asking the Commission to amend its signal booster rules to limit provider-specific consumer boosters to fixed, in building use, to harmonize the provider-specific booster antenna kitting rule with the wideband consumer booster antenna kitting rule, and to require boosters designed for fixed, indoor use to be labeled to reflect that they may only be used in a fixed indoor location.[1]

Nextivity opposed the Joint Petition[2] even though it previously joined Verizon Wireless, T-Mobile, USA, Inc., V-COMM, L.L.C., and Wilson Electronics in making a comprehensive proposal to the Commission that included draft rules governing the operation, labeling, and sale of consumer boosters and two sets of technical standards to protect against harmful interference

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[1] Petition for Reconsideration of V-COMM, L.L.C., Verizon Wireless and Wilson Electronics, WT Docket No. 10-4, filed May 13, 2013 ("Joint Petition.")

[2] Opposition to Petition for Reconsideration, WT Docket No. 10-4, filed by Nextivity, Inc. on June 21, 2013 ("Nextivity Opposition").

to carrier networks.[3] In that filing, the parties stated "Protection Standard 2 would apply to 'frequency selective' consumer boosters designed to operate in *fixed, in building locations . . .*"[4] As discussed below, Verizon Wireless disagrees with Nextivity regarding the interference and E911 location accuracy effects that can result from provider-specific boosters being operated in a mobile environment.[5]

I. PETITIONERS HAVE DEMONSTRATED THAT THEIR REQUESTED RULE CHANGES SERVE THE PUBLIC INTEREST.

Nextivity argues that Petitioners have failed to demonstrate why the Commission should amend rules that were based upon thousands of pages of record input and that reflect a careful balance of complex technical issues. It contends that Petitioners have failed to set forth any details of potential interference or any actual instances of interference warranting a rule change.[6]

Verizon Wireless agrees with Nextivity that the Commission's signal booster rules were based on a substantial record and reflect a careful balance of the desire to put consumer boosters in the hands of customers that need them, while protecting carrier networks. The technical

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[3] Letter from Nextivity, Inc., T-Mobile, USA, Inc., V-COMM, L.L.C., Verizon Wireless, and Wilson Electronics to Marlene H. Dortch, WT Docket No. 10-4 (filed June 8, 2012) ("Joint Proposal").

[4] Joint Proposal, Cover Letter at 1 (emphasis added). The Consumer Booster Safe Harbor Protection Standard 2 also included the following definition: "*Frequency selective consumer booster.* A *fixed* consumer booster designed to operate on some or all of the frequencies of a licensee's network, and meets the requirements below." (Emphasis added)

[5] Nextivity also opposes Joint Petitioners' request to eliminate, *inter alia*, the separate antenna kitting requirement for mobile provider-specific consumer boosters. It contends that the rule need not be amended because mobile provider-specific boosters will not cause interference and should be allowed. Nextivity Opposition at 15. As demonstrated in the Joint Petition and below, however, mobile provider-specific boosters will cause harmful interference, and thus there is no reason to have a separate antenna kitting requirement for mobile provider-specific boosters.

[6] *Id.* at 2-3

specification rules adopted by the Commission come directly from the Safe Harbors 1 and 2 (for wideband and provider-specific boosters respectively) in the Joint Proposal. In adopting these rules, the Commission found that the Joint Proposal "received overwhelming record support," including support from the four largest nationwide providers plus the membership of both RCA and CCA. The Commission found further that the Joint Proposal protection standards "appropriately balance the need to protect wireless networks with the need to provide consumers with affordable signal booster options."[7]

The Commission, however, materially changed Safe Harbor 2, without explanation, by not limiting provider-specific boosters to fixed, indoor operation. As such, the rules adopted actually upset the carefully balanced proposal agreed to by Nextivity and supported by hundreds of other parties. Petitioners demonstrated in the Joint Petition that allowing provider-specific boosters to be operated in outdoor and mobile environments substantially increases the likelihood that such boosters will interfere with other mobile devices, diminishes 911 location accuracy, and interferes with adjacent carrier base stations.[8] Accordingly, Petitioners have shown that the requested rule changes serve the public interest.

II. LIMITING PROVIDER-SPECIFIC BOOSTERS TO FIXED, INDOOR LOCATIONS WILL NOT HARM THE PUBLIC INTEREST.

Nextivity argues that limiting provider-specific boosters to fixed indoor uses will harm the public interest. It contends that its Cel-Fi booster is in the process of being approved by

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[7] *Amendment of Parts 1, 2, 22, 24, 27, 90 and 95 of the Commission's Rules to Improve Wireless Coverage Through the Use of Signal Boosters*, Report and Order, 28 FCC Rcd 1663 (2013) ("*Booster Order*"), at ¶ 71.

[8] Joint Petition at 4-8. Since there currently are no FCC-approved provider-specific boosters, showing actual interference at this time is not possible.

AT&T for use in a variety of operating environments, that a number of countries are moving quickly towards incorporating carrier-specific boosters into mobile environments, that the need and demand for mobile boosters are rising, and that limiting provider-specific consumer boosters to fixed indoor uses will impair technology development in the United States.[9]

Verizon Wireless has no quarrel with Nextivity's contentions regarding the need or demand for mobile consumer signal boosters. The rules adopted by the Commission address that demand by enabling consumers to purchase and operate mobile wideband signal boosters. In fact, while the Commission labeled the boosters designed to meet Safe Harbor 1 "wideband consumer signal boosters," the technical specifications for such boosters do not require them to be wideband boosters. Thus, if Nextivity or any other manufacturer wants to design, build and sell a mobile consumer booster that operates only on the particular frequencies of any carrier, they may do so under the wideband consumer booster technical specifications. All they cannot do is build a mobile booster under the provider-specific booster specifications. Accordingly, the rule change requested by the Joint Petitioners will not harm the public interest in any way.

Verizon disagrees that the public interest will be served by allowing customers to operate provider-specific consumer boosters in a manner that will cause harmful interference and diminish 911 location accuracy. As an initial matter, Nextivity fails to explain how it previously agreed to a proposal that explicitly limited provider-specific consumer boosters to fixed, indoor uses, but now claims that amending the rules to be consistent with that proposal is contrary to the public interest. Verizon also disagrees with Nextivity's claim that limiting provider-specific consumer boosters to fixed, indoor use will somehow impact how AT&T's customers may use

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[9] Nextivity Opposition at 3-5.

Nextivity's product. Verizon notes, in that regard, that AT&T filed comments supporting the Joint Petition.[10]

III. THE SIGNIFICANTLY HIGHER NOISE AND GAIN LIMITS PERMITTED FOR PROVIDER-SPECIFIC CONSUMER BOOSTERS WILL CAUSE INTERFERENCE IN A MOBILE ENVIRONMENT.

Nextivity argues that placing a provider-specific consumer booster in a car versus a fixed location does not impact whether the boosters cause harmful interference. In support of this claim, it argues that Joint Petitioners agreed with Nextivity that the -37 dBm/MHz downlink noise limit for provider-specific boosters was safe; that Joint Petitioners mischaracterize the applicable uplink noise level for provider-specific boosters; and that provider-specific boosters will not operate at the 100 dB maximum gain limits due to gain limiting anti-oscillation requirements.[11] Verizon Wireless disagrees on each point.

With respect to Nextivity's claim that Joint Petitioners agreed that the -37 dBm downlink noise limit for provider-specific boosters was safe, that statement is only true with respect to operations in fixed, indoor locations as specified in the Joint Proposal. As explained in the Joint Petition, the higher noise limits are acceptable in buildings where booster installations have substantially more penetration losses through building structures and inside walls and obstructions.[12] This is precisely why provider-specific boosters were limited to fixed, indoor locations in the Joint Proposal.

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[10] AT&T's Response to Petition for Reconsideration of V-COMM, L.L.C., Verizon Wireless and Wilson Electronics, WT Docket No. 10-4, filed June 21, 2013.

[11] Nextivity Opposition at 10-13.

[12] Joint Petition at 4-6.

Nextivity's claim that the applicable uplink noise limit for provider-specific boosters is -13 dBm/MHz – the same limit that applies to handsets, not -3 dBm/MHz as stated in the Joint Petition, is also wrong. The FCC's out-of-band emission limits for broadband noise outside the operating band is equivalent to -3 dBm/MHz for frequencies below 1 GHz.[13] This broadband noise limit is permitted for provider-specific boosters per the FCC out-of-band emission limits for frequencies below 1 GHz, and is an extremely high level of noise that will be transmitted on uplink to sensitive CMRS base station receivers. Moreover, unlike handsets that adjust power levels up to 1000 times per second, provider-specific boosters used in mobile applications may not adjust uplink noise and gain levels in time to prevent interference to adjacent base stations.[14]

Nextivity argues that Joint Petitioners' concerns about the higher gain limits for provider-specific boosters are over stated because such boosters will not be able to achieve 100 dB of isolation necessary to allow the booster to operate at 100 dB of gain.[15] As stated in the Joint Petition, however, there is a large difference between permitted gain levels of 15, 23 and 50 dB for wideband mobile boosters and 100 dB for provider-specific boosters.[16] In most standard vehicle installations, Verizon Wireless agrees that 100 dB of isolation will be difficult to achieve; however, a mobile installation can achieve a gain level that is substantially greater than 50 dB. For example, in a previous filing, Nextivity illustrates a mobile booster with gain of

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[13] *See* 47 C.F.R. § 22.917(b) (setting forth the emission limitations for cellular using a resolution bandwidth of 100 kHz for emissions of 43+10*log(P), which is -13 dBm/100kHz). For broadband noise, this out-of-band limit is equivalent to -3 dBm/MHz. *See also* 47 C.F.R. §§27.53(c)(5) and 27.53(g)(5) (setting forth the emission limitations for the Upper and Lower 700 MHz bands, respectively).

[14] *See* Joint Petition at 7-8.

[15] Nextivity Opposition at 12.

[16] Joint Petition at 5-6.

approximately 68 dB.[17] Assuming a 5 dB noise figure, this is equivalent to a transmitted uplink and downlink co-channel noise level of -41 dBm/MHz for this particular booster application. At a distance of 3 meters from the vehicle, with a path loss of 50 dB at PCS frequencies, this results in a -91 dBm/MHz or -81 dBm/10MHz received noise level that can interfere with surrounding nearby co-channel mobile devices.[18]

IV. CARRIER CERTIFICATION CANNOT BE RELIED UPON TO PROTECT CUSTOMERS OR ADJACENT CARRIER NETWORKS FROM INTERFERENCE.

Nextivity contends that the requirement that provider-specific consumer boosters receive carrier approval and certification prior to Commission certification will "ensur[e] that the device does not cause interference to adjacent channels."[19] Verizon disagrees. As noted in the Joint Petition, because the interference effects are experienced by subscribers and networks of licensees other than the approving licensee, the approving licensee cannot be relied upon or expected to protect against these harms. Indeed, if that were the case, technical requirements would not be necessary.

V. THE HIGHER NOISE AND GAIN LIMITS FOR PROVIDER-SPECIFIC SIGNAL BOOSTERS WILL DIMINISH 911 LOCATION ACCURACY FOR NEARBY DEVICES.

Nextivity argues that allowing provider-specific consumer boosters to be operated in mobile vehicles will not impact 911 location accuracy any more than such boosters use in fixed

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[17] Letter from Catherine Wang, counsel for Nextivity, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 10-4, filed June 17, 2013 at second to last slide in attached presentation.

[18] This path loss calculation is based on a total distance of 4 meters from the signal booster -- 1 meter inside the vehicle and 3 meters outside the vehicle.

[19] Nextivity Opposition at 9-10.

environments. It claims that carriers that determine location via triangulation use the first arriving path in time as a reference for location information and that the presence of a booster does not fundamentally alter this method of operation.[20] Verizon Wireless disagrees.

As stated in the Joint Petition, provider-specific boosters can operate at much higher gain levels than permitted for wideband mobile boosters and will have signals extending far outside the vehicle.[21] Because the booster can operate with substantially higher gain, devices within range of the booster will be powered back by the serving cell site. The cell site controls the power of the mobile device based on receiving the strongest signal from the device, in this case from the booster. The cell site cannot control the booster, only the connected mobile device, so it will reduce the mobile device's power. When the mobile device is powered down, the cell may not be able to receive or may have difficulty locking onto the direct signal from the mobile. The location determination would therefore be based on the signal from the booster. As such, provider-specific boosters in vehicles can impact E911 location accuracy. Callers located outside the vehicle equipped with the booster would not be aware of the impacts since they would not know their calls are being affected by the booster and they would not be able to see the FCC-mandated E911 warning labels required to be placed on the booster.

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[20] Nextivity Opposition at 14-15.

[21] Joint Petition at 4-7.

VI. CONCLUSION

Nextivity, which previously agreed that the provider-specific consumer booster technical standards should only apply to boosters operated in fixed indoor locations, has failed to demonstrate that such boosters can be operated safely in a mobile environment. Accordingly, the Commission should grant the petition for reconsideration filed by the Joint Petitioners and amend its rules to require that provider-specific boosters be operated in fixed, in-building locations only. The Commission should also amend the provider-specific booster antenna kitting rules to eliminate the separate requirement for mobile boosters and conform that requirement to the wideband consumer booster antenna kitting rule. Finally, the Commission should require that all boosters designed and certified for fixed, in-building use be labeled to notify customers that such boosters may only be used in fixed environments.

Respectfully submitted,

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Certificate of Service

I hereby certify that on this 1st day of July copies of the foregoing "Verizon Wireless Reply to Opposition" in WT Docket 10-4 were sent by US Mail to the following parties:

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